

REMARKS

Applicants respectfully traverse the rejections of the Office Action mailed June 11, 2009 ("6/11 OA") and request reconsideration. Claims 1, 17, 20, 22-25, 27, 30, 46, 49, 50, 52-54, 56, 67, 83, 86, 87, 89-91, 93, 105, 115, 131, 134, 135, 137-139, 141, 152, 168, 171, 172, 174-176 and 178 are hereby amended. Claims 2, 31, 68, 130 and 167 are hereby canceled. Claims 1 and 17-29 remain pending. Claims 3-16 and 30, 32-67, 69-129, 131-166 and 168-189 remain withdrawn. No new matter has been added.

Allowable Subject Matter

Applicants thank the Examiner for acknowledging the allowability of claims 17-29 if rewritten to overcome the 35 U.S.C. § 112, second paragraph, rejections. See 6/11 OA, page 5, ¶ 8. Remarks and/or corrections have been made in this Response below directed to such 35 U.S.C. § 112, second paragraph, issues.

Rejections under 35 U.S.C. § 112, Second Paragraph

Claims 1, 2 and 17-29 stand rejected under 35 U.S.C. § 112, second paragraph, because claims 1, 2, 17, 20-25 and 27 are "unclear" or lack "clear antecedent basis." See 6/11 OA, page 4, ¶ 7.

Claim 1 was rejected because "on line 3, it is unclear if there is one apparatus or more than one since the plural of apparatus is not used." See 6/11 OA, page 4, ¶ 7, lines 3-5. Applicant is confused by this rejection and requests further elaboration in view of the following remarks. The Merriam-Webster online dictionary sets forth that the proper ordinary plural forms of the word "apparatus" are "apparatuses" **or** "apparatus." See Exhibit A attached hereto and incorporated herein. Moreover, claim 1 at line 3 recites "an array of natural accelerated weathering test apparatus" (emphases added). The Merriam-Webster online dictionary sets forth that the ordinary meaning of the word "array" as used in the context of claim 1 is "a group of

elements forming a complete unit" (emphasis added). See Exhibit B, attached hereto and incorporated herein. Accordingly, Applicant respectfully submits that it is abundantly clear in claim 1 that "an array of natural accelerated weathering test apparatus" refers to more than one (1) "natural accelerated weathering test apparatus."

Claim 1 was further rejected because "on line 9, it is unclear if the "apparatus" is the same as those of line 3 or are these different "sets"? See 6/11 OA, page 4, ¶ 7, lines 5-6. Applicant is again confused by this rejection and requests further elaboration in view of the following remarks. Initially, Applicant can identify only eight (8) lines in claim 1. As a result, Applicant assumes that the rejection refers to lines 7 and 8 of claim 1 and the following remarks are based on such assumption. Applicant respectfully submits that "a plurality of sets...defined within the array" clearly recites to one of ordinary skill in the art there is more than one set of the natural accelerated weathering test apparatus defined within the array. Accordingly, Applicant is confused as to what exactly is unclear. Therefore, in view of the foregoing, Applicant respectfully requests that the rejection of claim 1 based on 35 U.S.C. § 112, second paragraph, be withdrawn.

Claim 2 was rejected because "on lines 7 and 8, it is unclear if the apparatus for adjusting temperature differs from the temperature control system of claim 1." See 6/11 OA, page 4, ¶ 7, lines 6-8. In view of the fact that claim 2 has been canceled, Applicant respectfully submits that the rejection of claim 2 based on 35 U.S.C. § 112, second paragraph, is moot and requests that such rejection be withdrawn.

Claim 17 was rejected because "each instance of 'the target board' is unclear since each 'apparatus' includes a target board as in claim 2" and "on line 12, 'the apparatus' and each instance of 'the test specimen' lacks clear antecedent basis." See 6/11 OA, page 4, ¶ 7, lines 8-11. In view of the fact that claim 17 has been amended, Applicant respectfully submits that the

rejection of claim 17 based on 35 U.S.C. § 112, second paragraph, is moot and requests that such rejection be withdrawn.

Claim 20 was rejected because "'the target board' on lines 2-3 lacks clear antecedent basis." See 6/11 OA, page 4, ¶ 7, lines 11-12. In view of the fact that claim 20 has been amended, Applicant respectfully submits that the rejection of claim 20 based on 35 U.S.C. § 112, second paragraph, is moot and requests that such rejection be withdrawn.

Claim 21 was rejected because "in line 2, 'the panel' lacks antecedent basis." See 6/11 OA, page 4, ¶ 7, line 12. Applicant is confused by this rejection and requests further elaboration in view of the following remarks. The claim element "the panel" occurs once in claim 21 on line 2. Claim 21 depends from claim 20, wherein the claim element "a panel" is positively recited. Accordingly, Applicant respectfully submits that there is proper antecedent basis and requests that such rejection be withdrawn.

Claims 22-25 and 27 were rejected because "on line 1, 'the apparatus' lacks clear antecedent basis." See 6/11 OA, pages 4-5, ¶ 7, lines 12-13. In view of the fact that claims 22-25 and 27 have been amended, Applicant respectfully submits that the rejection of claims 22-25 and 27 based on 35 U.S.C. § 112, second paragraph, is moot and requests that such rejection be withdrawn.

Claim 23 was rejected because "on line 4, 'the specimen' lacks clear antecedent basis." See 6/11 OA, page 5, ¶ 7, lines 13-14. In view of the fact that claim 23 has been amended, Applicant respectfully submits that the rejection of claim 23 based on 35 U.S.C. § 112, second paragraph, is moot and requests that such rejection be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claim 1 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,423,469 (issued Dec. 27, 1983) to Zerlaut, et al., [hereinafter "Zerlaut"]. See 6/11 OA, page 3, ¶ 5.

Regarding the disclosure of Zerlaut, the 6/11 OA states that Zerlaut describes:

a prior art device including an array of test apparatus (array of lamps) which concentrate solar radiation on a test specimen (solar collectors), each apparatus including a temperature control system (circulating hot water or cooling air pump in embodiment of fig. 3 and 4) and where the lamps are exposed to different solar radiation intensity due to the unequal distances to the plane of the lamp array, see col. 1, lines 44 *et seq.*

Applicant respectfully submits that, in fact, Zerlaut fails to disclose, teach or suggest all of the structural and functional elements and limitations as required in Claim 1. Zerlaut describes his invention as a "solar simulator for simulating radiation received from the sun." See Zerlaut, col. 1, lines 5-6 (emphasis added). The "solar simulator 1 includes an adjustable lamp array 3 containing a large number of directionally adjustable solar lamps, such as 61 (FIG. 4) mounted on a lamp array frame 39, a pivot base 33, a lamp array support 5 to which pivot base 33 is pivotally attached, and a simulator stand 7, also referred to as gantry crane 7." See Zerlaut, col. 3, lines 60-66. Zerlaut states with respect to a singular embodiment and application that the solar simulator is used to test the efficiency and reliability of solar collectors (e.g., flat solar collectors for receiving radiation from the sun and converting it to heat water for use in hot water heaters and the like). See Zerlaut, col. 1, lines 10-17. The Zerlaut solar simulator of FIG. 1 is used inside a building taller than the 28 foot tall solar simulator. See Zerlaut, col. 5, lines 56-59.

The 6/11 OA further states that Zerlaut describes "a prior art device including an array of test apparatus (array of lamps) which concentrate solar radiation on a test specimen (solar collectors)." See 6/11 OA, page 3, ¶ 5, lines 3-4. Applicant respectfully disagrees with this

mischaracterization of Zerlaut. First, there is not an array of test apparatus in Zerlaut. Rather, there is only one simulator used in connection with one collector to be tested. The definition of "array" has been discussed above and the singular apparatus of Zerlaut fails to meet such definition as would be understood by one of ordinary skill in the art. There is no teaching or suggestion in Zerlaut that a plurality of simulators may be used in an array or even simultaneously. Applicant respectfully requests that the above statement from the 6/11 OA be supported by specific reference to Zerlaut.

Second, assuming *arguendo* that the individual lamps in an array disposed on a single apparatus could be somehow characterized as an array of test apparatus, Zerlaut fails to disclose, teach or suggest the element required by Claim 1; namely, "an array of natural accelerated weathering test apparatus." The Zerlaut simulator uses electric lamps which one of ordinary skill in the art will immediately recognize as artificial light sources that do not concentrate solar (natural) radiation but rather lamp (artificial) radiation that is distinct and different from solar (natural) radiation. More specifically, the spectral distribution of iodide lamps, as the preferred lamp light source disclosed in Zerlaut, is only an approximation of the natural solar spectrum and the iodide lamp spectrum is subject to deficiencies in many ways as Zerlaut points out in col. 2, lines 20-23 (by varying power supply), in col. 3, lines 4-11 (due to the unnatural infrared component of the lamp radiation spectra), in col. 5, lines 12-13 ("...*similar* to the optical spectrum of the sun" but not the sun). One of ordinary skill in the art will recognize that any other lamp (artificial) radiation will have similar differences. Clearly, the spectral distribution of an artificial light source (lamp) is only an approximation and requires additional filtering (See Zerlaut, col. 9, lines 26-34), power requirements, etc. to improve the approximation to an acceptable level for collector performance testing (not weathering). Therefore, Zerlaut fails to

disclose, teach or suggest a natural accelerated weathering test apparatus that concentrates solar radiation, as required by Claim 1.

Third, the 6/11 OA states that Zerlaut discloses "an array of test apparatus (array of lamps) which concentrate solar radiation on a test specimen (solar collector)." See 6/11 OA, page 3, ¶ 5, lines 3-4. Applicant respectfully submits that Zerlaut fails to disclose, teach or suggest the elements and limitations required in Claim 1. Zerlaut is specifically for testing the performance (efficiency) of solar collectors (See Zerlaut, col. 9, line 56 – col. 11, line 66). Nowhere does Zerlaut discuss actual weathering or degradation of materials exposed over time to the simulator. One of ordinary skill in the art will immediately recognize that measuring thermodynamic performance of solar collectors is distinct and different from characterizing the photochemical and physical degradation involved in "weathering". Zerlaut's device is clearly designed for short (less than one day) operation during which efficiency properties of solar collectors may be characterized as clearly described in col. 9, line 56 through col. 11, line 66. These thermodynamic system characterizations in Zerlaut focus on temperature difference of fluids entering and leaving the solar collector. Weathering properties, on the other hand, and specifically weathering reciprocity characterizations require much longer exposure to solar radiation (typically months or years) during which the actual material characteristics degradation may be characterized. (Emphasis added.) These fundamental material property characterizations focus on physical and chemical changes in materials induced by photo reactions (typically photo-oxidation) caused by solar UV radiation exposure. (Emphasis added.) It is clear that one skilled in the art would not consider using the Zerlaut solar simulator apparatus to attempt to "weather" (cause materials to photo-oxidize over time) due to cost, unnatural spectra and artificial environmental variables, maintenance required, time, etc. (Emphasis added.) The Zerlaut solar simulator device is only designed to assist in the measurement of collector performance.

Therefore, Zerlaut fails to disclose, teach or suggest the elements and limitations required by Claim 1.

Fourth, the 6/11 OA states that Zerlaut discloses "each apparatus including a temperature control system (circulating hot water or cooling air pump in embodiment of FIG. 3 and 4)." See 6/11 OA, page 3, ¶ 5, lines 4-6. Applicant respectfully disagrees and submits that Zerlaut fails to disclose, teach or suggest the elements and limitations required by Claim 1. FIGS. 3 and 4 show cooling of the artificial light sources of the Zerlaut device – not cooling of the solar collector that is being exposed to the lamp radiation. This is distinctly different than the exposure specimen temperature control required for reciprocity characterization as recited in Claim 1. The Zerlaut device requires cooling of the light sources in order to prevent overheating of the light sources (as shown in FIGS. 3 and 4) and to reduce variations in the light source spectral distribution. Neither in FIGS. 3 and 4 nor anywhere in Zerlaut describes the need or techniques for externally controlling the test specimen temperature because the Zerlaut device is not aimed toward characterizing a material's reciprocity characteristics. Proper specimen temperature control is critical to reciprocity characterizations. Temperatures must be simultaneously maintained for (at least) two specimens under different irradiances in order to characterize a material's reciprocity characteristics. The weathering degradation rate of materials may be increased by increasing the temperature. If two specimens of a material are subjected to different irradiance intensities and not held at near identical temperatures, the irradiance variable effect will be confounded by the temperature variable effect resulting in the researcher not being able to characterize the irradiance variable effect alone on the materials degradation rates which is key to characterizing a material's weathering reciprocity characteristics. This possibility of confounding is not obvious and great effort must be taken to account for this interaction. Any reciprocity characterization method must take great care to independently control irradiance at different levels for at least

two specimens simultaneously while insuring the same temperature environment within the at least two specimens under different irradiance intensities. This situation is clearly not addressed anywhere in Zerlaut nor is it obvious to those skilled in the art since material temperature normally co-varies with irradiance intensity. De-coupling these two variables (irradiance intensity and material temperature) is one key to the assembly and methodology of reciprocity characterization which is not addressed in Zerlaut. Therefore, Zerlaut fails to disclose, teach or suggest the elements and limitations required by Claim 1.

Fifth, the 6/11 OA states that "the lamps are exposed to different solar radiation due to the unequal distances to the plane of the lamp array, see col. 1, lines 44 *et seq.*" See 6/11 OA, page 3, ¶ 5, lines 6-8. Applicant respectfully disagrees and submits that Zerlaut fails to disclose, teach or suggest the elements and limitations required by Claim 1. The lamps are not intended to (and are not) be exposed to solar [sic] radiation, rather the lamps are the source of the artificial radiation in the Zerlaut device. Furthermore, in Zerlaut, the solar collectors which are to be exposed to the radiation from the lamps are intended to be exposed to uniform radiation intensity rather than "...exposed to different solar [sic] radiation intensity..." as stated in the 6/11 OA. This requirement for uniform intensity is clearly stated throughout Zerlaut in at least the claims (col. 12, lines 39-40; col. 14, lines 41-43; and col. 13, lines 37-43). Materials reciprocity characterizations, on the other hand, need the same specimens to be exposed to different radiation intensities while maintaining the same specimen temperature under the different irradiance intensities. The intent of the apparatus described in Zerlaut, including the linkages yoking individual lamps (FIGS. 2, 6, 7, 8 and 10; col. 12, lines 20-24; col. 5, lines 18-21, etc.) and maintaining the lamp array parallel to the test specimen (col. 6, lines 44-46, etc.), is to achieve a single uniform intensity across a single solar collector test specimen (col. 6, lines 46-50). This design requirement detailed throughout Zerlaut clearly shows this device is not

designed for and would not be able to properly characterize a material's reciprocity characteristics in an exposure of a material. Please note that col. 1, lines 44 *et seq.* do not mention anything regarding distances to the plane of the lamp array. Additionally, it is clear throughout the 6/11 OA that the statement "...are exposed to different solar [sic] radiation intensity due to unequal distances to the plane of the lamp array..." is essentially the opposite of what is actually described in Zerlaut. (Emphasis added.) First, with regard to the clause "...different solar [sic] radiation intensity...", Zerlaut clearly states the need for uniform (not "different") radiation intensity as noted in col. 1, lines 31 and 59-65; col. 3, lines 27-29; col. 6, lines 44-50, 53-58 and 59-64; col. 7, lines 11-15 and 18-21; col. 8, lines 48-51; col. 9, lines 1-3; col. 12, lines 37-43; and col. 14, lines 1-4 and 41-43. (Emphasis added.) Second, with regard to the clause "...due to unequal distances to the plane of the lamp array...", Zerlaut clearly states the need to maintain equal distances (not "unequal") to and parallel orientations between the lamp array and the test specimen surface as noted in col. 5, lines 16-21; col. 6, lines 1-2, 36-37 and 44-50; col. 7, lines 1-5 and 15-18; col. 8, lines 3-7 and 15-17; col. 12, lines 20-30; col. 13, lines 28-31 and 39-44; col. 14, lines 32-36; and FIGS. 6, 7, 8 and 10. (Emphasis added.) Therefore, Zerlaut fails to disclose, teach or suggest the elements and limitations required by Claim 1.

Regarding what Zerlaut fails to disclose, the 6/11 OA states that:

It is noted that Zerlaut, et al. fail to specify the assembly as for characterizing weathering reciprocity. However, the usage of solar simulators to characterize weathering reciprocity is old and well-known since solar radiation is a cause of weathering. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have designated the solar simulators disclosed by Zerlaut, et al. as an assembly for characterizing weathering reciprocity since solar radiation is known to cause weathering.

See 6/11 OA, page 3, ¶ 5, lines 8-15.

Applicant respectfully submits that using solar simulators to characterize reciprocity for weathering effects is not old and well-known. In fact, Applicant traverses the 6/11 OA conclusion to the contrary and demands, under MPEP § 2144.03, support for such conclusion with adequate documentary evidence. The departures from strict reciprocity in materials characterized using the assembly and methods in the subject application were surprisingly unexpected and not anticipated by the industry. Indeed, to the contrary, published technical literature by NIST has referred to strict reciprocity in weathering as "The Law of Reciprocity" until confronted with data generated from the subject application. Indeed, the current state of the art in weathering technology – by those skilled in the art throughout the industry – regularly dismisses the implications of reciprocity failure by assuming that a 300 MJ/m² UV radiant exposure at a high static intensity level in an artificial weathering device will produce equivalent material degradation results as a 300 MJ/m² UV radiant exposure in a real world end use outdoor low dynamic intensity level. Thus, the practice of characterizing a material's weathering reciprocity characteristics (and the consequences to such material's service life prediction) are not widely recognized by those skilled in the art of weathering. Furthermore, it would not have been obvious to one of ordinary skill in the art at the time of the invention to have designed the solar simulator disclosed by Zerlaut as an assembly for characterizing weathering reciprocity since: 1) the Zerlaut solar simulator is not designed for causing weathering degradation on materials – it is designed for short duration exposures as part of a diagnostic measurement system for solar collector efficiency measurements; 2) the Zerlaut device does not have the ability to simultaneously expose two specimens at different irradiation intensities while maintaining the same temperature level of the materials under two different irradiant intensities which is a requirement for weathering reciprocity characterizations; and 3) the light sources used only provide a highly variable and questionable approximation of the actual solar spectral

distribution which is known to be critical for realistic material photochemistry and subsequent realistic weathering degradation of materials.

Moreover, the leap in logic from: 1) understanding that "solar radiation is known to cause weathering"; to 2) "...being obvious to one of ordinary skill in the art at the time of the invention to have designated the solar simulators disclosed by Zerlaut as an assembly for characterizing weathering reciprocity" is questionable at best since the Zerlaut device does not have the capability to perform reciprocity characterizations, specifically simultaneous exposure of at least two identical material specimens under two different natural solar light intensities while maintaining the same exposure temperature on both specimens. Therefore, Zerlaut fails to disclose, teach or suggest the elements and limitations required by Claim 1.

Reconsideration and withdrawal of the 35 U.S.C. § 103(a) rejection of Claim 1 is respectfully requested in view of the above discussion. Consequently, Applicant respectfully submits that Claim 1 is in condition for allowance and earnestly requests such action. Claim 2 has been canceled. Accordingly, the rejection thereof is moot. Claims 17-29 have been indicated as allowable if amended to overcome the 35 U.S.C. § 112, second paragraph, rejections. However, in view of the foregoing, Applicant respectfully submits that Claims 17-29, which depend directly or indirectly from Claim 1, are also in condition for allowance for at least the reasons set forth above with respect to Claim 1 and for at least the reasons as indicated in the 6/11 OA.

Rejoinder

Applicant respectfully submits that Claim 1, as amended, is in condition for allowance. Consequently, Applicant respectfully requests that the restriction requirement mailed on March 16, 2009 (the "3/16 RR") be reconsidered and withdrawn and that Claims 3-16 and 30, 32-67, 69-129, 131-166 and 168-189 be rejoined pursuant to MPEP § 821.04. The 3/16 RR stated that

"Claim 1 appears to link all of the claims, and thus, all of the claims may be rejoined in the event that Claim 1 is found to be allowable over prior art." See 3/16 RR, page 7, ¶ 3, lines 1-3.

Claims 3-16 depend, directly or indirectly, from allowable Claim 1 and should be rejoined for at least requiring the same elements and limitations of Claim 1. Claims 30, 32-67, 69-129, 131-166 and 168-189 require all of the limitations of the allowable Claim 1. Accordingly, rejoinder of Claims 3-16, 30, 32-67, 69-129, 131-166 and 168-189 is proper and earnestly solicited.

CONCLUSION

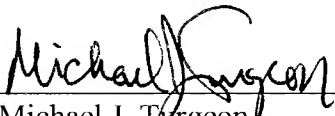
No amendment made was related to the statutory requirements of patentability unless expressly stated herein. Also, no amendment made was for the purpose of narrowing the scope of any claim, unless Applicants have argued herein that such amendment was made to distinguish over a particular reference or combination of references.

The Commissioner is hereby authorized to deduct any additional fees arising as a result of this response, including any fees for Extensions of Time, or any other communication from or to credit any overpayments to Deposit Account No. 22-0259.

It is submitted that the claims clearly define the invention, are supported by the specification and drawings, and are in condition for allowance. Applicant respectfully requests that a timely Notice of Allowance be issued in this case. Should the Examiner have any questions or concerns that may expedite the prosecution of the present application, the Examiner is encouraged to telephone the undersigned.

Respectfully submitted,

Date: September 11, 2009

By: 
Michael J. Turgeon
Registration No. 39,404

Vedder Price, P.C.
222 N. LaSalle St., Suite 2400
Chicago, Illinois 60601
phone: (312) 609-7716
fax: (312) 609-5005

EXHIBIT A



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Golgi apparatus (noun)

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Main Entry: **ap·pa·ra·tus**  

Pronunciation: \,a-p- 'ra-t s, -'rā-\

Function: *noun*

Inflected Form(s): *plural* **ap·pa·ra·tus·es** or **ap·pa·ra·tus**

Etymology: Latin, from *apparare* to prepare, from *ad-* + *parare* to prepare — more at **PARE**

Date: circa 1628

- 1 a** : a set of materials or equipment designed for a particular use **b** : a group of anatomical or cytological parts functioning together <mitotic *apparatus*> **c** : an instrument or appliance designed for a specific operation
- 2** : the functional processes by means of which a systematized activity is carried out <the *apparatus* of society>: as **a** : the machinery of government **b** : the organization of a political party or an underground movement

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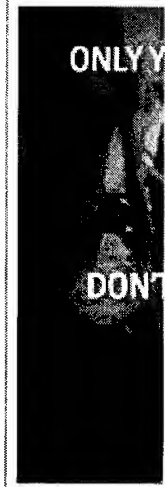
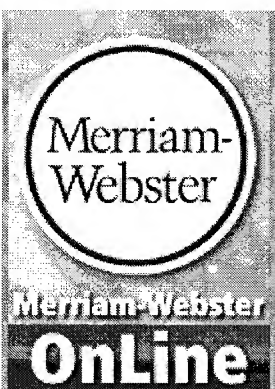


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¹array (transitive verb)

²array (noun)

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Main Entry: ²**array**

Function: *noun*

Date: 14th century

1 a : a regular and imposing grouping or arrangement : ORDER <lined up...in soldierly *array* — Donald Barthelme> **b** : an orderly listing of jurors impaneled

2 a : CLOTHING, ATTIRE **b** : rich or beautiful apparel : FINERY

3 : a body of soldiers : MILITIA <the baron and his feudal *array*>

4 : an imposing group : large number <faced a whole *array* of problems>; *also* : VARIETY, ASSORTMENT <a broad *array* of styles>

5 a (1) : a number of mathematical elements arranged in rows and columns **(2)** : a data structure in which similar elements of data are arranged in a table **b** : a series of statistical data arranged in classes in order of magnitude

6 : a group of elements forming a complete unit <an antenna *array*>

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